SECTION 12: PRECONCEPTION AND PREGNANCY CARE

Concern	Care/Test	Frequency
Preconception and Pregnancy Care	♦ Provide preconception counseling/assessment..... ♦ Assess contraception/discuss family planning ..... ♦ Screen for gestational diabetes	3 – 4 months prior to conception* At diagnosis and each focused visit* At 24 – 28 weeks gestation or sooner if high risk* * consider referring to provider experienced in care of diabetic women during pregnancy

Women with either preexisting or gestational diabetes are at a higher risk of maternal and infant complications during pregnancy and postpartum when compared to women without diabetes. However, preconception counseling, intensive management to optimize glycemic control before pregnancy and during pregnancy, and utilizing a ***team*** of providers experienced in caring for women with diabetes may help these at risk women achieve health outcomes similar to those of women without diabetes.

Maternal normoglycemia is necessary prior to conception, during fetal organogenesis, and throughout gestation, and has been shown to decrease infant and maternal morbidity and mortality. Both fasting and post-prandial plasma glucose levels are strong predictors of the outcomes of pregnancy complicated by diabetes. The A1c level is a strong predictor of fetal congenital anomalies. When A1c is markedly higher (i.e., > 6.0 %, although this may vary with labs) in the first eight weeks of pregnancy, the risk for congenital anomaly is as high as 25%. Examples of fetal risks include the following:

- Insulin effect and other fetal growth factors may be associated with macrosomia and birth injuries.
- Maternal vascular disease affects the uterine blood supply, resulting in fetal growth restriction (FGR) and intrauterine growth restriction (IUGR).
- Hypoglycemia is more common in infants born to insulin-dependent mothers and may require intravenous glucose infusions.
- The postpartum period may be complicated further by the effects of hyperviscosity or the effects of hyperbilirubinemia.
- Fetal lung maturity may be delayed, resulting in respiratory distress syndrome (RDS) at higher gestational ages than typically seen.
- Hypertrophic cardiomyopathy may be significant enough to require medication.
- Neurologically, infants may be immature, have hypotonicity, and a poor suck reflex that delays adequate oral feeding development.
- Infants born to mothers with diabetes are at a higher risk for overweight or obesity and glucose intolerance in childhood and thereafter.

Other risks of uncontrolled diabetes potentially affecting the mother include aggravation of preexisting diabetes complications, increased risk of hypertensive disorders, such as pre-eclampsia, and increased risk for cesarean delivery.

Preexisting (Pre-gestational) Diabetes

Preexisting or pre-gestational diabetes refers to Type 1 or Type 2 diabetes diagnosed prior to pregnancy. Research shows that less than 50% of pregnancies in women with preexisting

diabetes are planned. Moreover, serious congenital malformations can occur early in pregnancy (often before a woman discovers that she is pregnant). Preconception care is recommended for all women with diabetes beginning before puberty and continuing until menopause. It is important for providers to assess a woman's desire for pregnancy, obtain routine diabetes screenings, exams and lab tests, and carefully monitor and re-evaluate existing complications as necessary in order to prepare for a desired or unexpected pregnancy.

The following guidelines, provided in Table 16, are general recommendations for preconception care. When designing and implementing a care plan for women with diabetes, cultural preferences, level of literacy, and other needs must be taken into consideration. If the woman is already pregnant, prenatal care must begin as soon as possible.

Ongoing communication among all professionals involved in treating women with preexisting or pre-gestational diabetes is essential to ensure optimal diabetes management during preconception and pregnancy.

Gestational Diabetes

Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with onset first recognized during pregnancy and after 20 weeks gestational age. The prevalence of GDM among U.S. women is approximately 4%, however the rate may vary between 1-14% depending on the population and the method of diagnostic tests used. GDM is more likely with advanced age, overweight and obesity, a family history of diabetes, a personal history of abnormal glucose tolerance, a prior macrocosmic infant, poor obstetric outcome, and in populations with a high risk of Type 2 diabetes (e.g., American Indians, African Americans, and Hispanic/Latino).

Uncontrolled GDM carries the following risks to both mother and fetus:

- An increase in hypertensive disorders such as pre-eclampsia during pregnancy.
- Macrosomia and its associated delivery risks.
- Increased potential for cesarean delivery.
- Postpartum delivery risks to the infant including hypoglycemia, seizures, hypocalcemia, polycythemia, and jaundice.
- Increased risk for the development of Type 2 diabetes later in the infant’s life.
- Development of GDM in subsequent pregnancies.
- Development of metabolic disorders including hypertension, dyslipidemia, arteriosclerotic cardiovascular disease, and Type 2 diabetes later in life.

Screening and Diagnosis

The screening and methodology for detection of GDM is controversial. The American Diabetes Association (ADA) outlines screening for GDM using risk status; this is summarized in Table 17. Although selective screening was proposed by both the Third and Fourth International Workshop Conferences, the method of choice may vary according to individual risk factors and population. Consultation with a local expert for recommendations may be helpful.

Table 16: Preconception Care and Recommendations

Preconception Care	Recommendations
General Counseling/ Education	• Provide information on maternal and neonatal risk of pregnancy. • Inform women that risk is minimized with optimal glycemic control prior to conception. • Encourage communication of desire/intent to become pregnant, discuss pre-pregnancy planning such as starting a folic acid supplement, smoking, alcohol, and recreational drug cessation, and limiting exposure to secondhand smoke. • Assess individual circumstances, (e.g., years with diabetes, level of control, history of complications). • Consult or refer to multidisciplinary team experienced in caring for women with diabetes. • Explain the need for frequent medical visits (up to two visits per week after 32 weeks) and frequent phone contact. • Detect pregnancy as early as possible; if suspected, seek testing and medical care immediately. • Discuss potential infertility issues; refer for counseling if attempts to become pregnant have exceeded six months.
Contraception	• Review contraceptive options. Oral contraception is a viable option for women with diabetes unless contraindicated (i.e., significant vasulopathy, hypertension, or a strong family history of thromboembolic disease). • Educate women about emergency contraception.
Medications	• If taking oral medications (Metformin, Glyburide, TZDs), switch to intensive insulin therapy. • Evaluate all medications/supplements for safety and teratogenicity (including other prescriptions, over-the-counter medications, herbal remedies, and teas).
Initial Medical Assessment/ Diabetes Focused Visits, Including Complication Screening *(Screening for Pre-conception complications is essential)*	• Complete a history and physical, including past pregnancy history, a gynecological exam, and a comprehensive foot exam. • Order lab work for: fasting lipid profile, urinalysis, culture and sensitivity, 24-hour urine test for creatinine clearance and protein, A1c, thyroid stimulating hormone (TSH), and any other lab work related to general health status. • Advise a daily prenatal vitamin containing at least 0.4 mg folic acid per tablet. (For women with prior history of neural tube defects a 4.0 mg/tablet of folic acid during the preconception period is recommended in order to reduce the risk of birth defects.) • Stabilize any existing health problems prior to pregnancy (e.g., hypertension, retinopathy, renal dysfunction, gastroparesis, or other neuropathies). • Obtain electrocardiogram if diabetes has been present for > 10 years (coronary artery disease is a relative contraindication to pregnancy). • Make a referral for a dilated retinal exam. If disease is present, frequent and close monitoring by a retinal specialist will be necessary. • Refer to dentist for complete oral screening (see Section 10: Oral Care). • Provide immunizations as scheduled. • Discuss routine prenatal care, including how to contact a medical provider.
Emotional/ Mental Health	• Discuss risk for prenatal and postpartum depression. • Assess and screen for depression and other psychosocial concerns (see Section 10: Emotional and Sexual Health Care). • Refer to mental health specialist as needed.

continued

Table 16: Preconception Care and Recommendations (continued)

Preconception Care	Recommendations
Medical Nutrition Therapy	• Refer to registered dietitian (RD) for nutritional assessment/recommendations, incorporating required nutrients needed during preconception, pregnancy, and during lactation. • Discuss small and frequent meals that can prevent post-prandial hyperglycemia and pre-meal starvation ketosis. • Individualize weight goals based on pre-pregnancy weight.
Self-Management/ Self-Monitoring	• Refer to a certified diabetes educator (CDE) for an educational assessment and to intensify self-management skills, including self-monitoring of blood glucose (SMBG) and testing frequency (fasting and 2-hr post medication). • Teach calibration of home glucose meters. Check the quality control of the meter with a supplied control solution and by ordering a meter/lab correlation to ensure that values are accurate (within 10% of lab). Be aware that some people have glucose meters that give values calibrated to whole blood and others to plasma. • Teach self-adjustments to treatment plans (diet, physical activity, and medication) based on SMBG results. • Discuss how metabolism is affected by pregnancy and how insulin needs will change. • Explain hypoglycemia and treatment options, including glucagon. • Discuss the demands of intensive diabetes management during preconception, pregnancy, and postpartum. • Encourage written blood glucose logs (note: most meters have downloading capability; however memory capability may not accommodate the frequency of data collected). • Provide instruction for urine ketone testing with recommended testing times and appropriate action to take if results are positive.
Pregnancy - Confirmed	• Discuss the specialized tests and exams to closely monitor fetal development and monitor for signs of distress (ultrasounds, including targeted anatomic assessment, formal fetal echocardiogram, serial growth ultrasound, and antenatal testing, biophysical profiles, non-stress tests, etc.). • Refer for counseling with pregnancy loss.
Postpartum Care	• Encourage continued self-management to maintain excellent glycemic control. • Discuss changes in insulin requirements. (Women with preexisting diabetes will have a precipitous drop postpartum and insulin doses will need to be recalculated.) • Explain insulin requirements during lactation. (Insulin requirements drop during the night when glucose is siphoned into the breast milk; therefore there may be an increased risk of hypoglycemia during the night.) • Women with Type 2 diabetes controlled with oral medication prior to pregnancy can discuss the option of switching back to oral medications. (Due to limited availability on the safety of the use of these drugs during lactation, this is done after the cessation of breastfeeding.) • Offer contraception options immediately. • Discuss importance of maintaining or resuming care with usual primary care provider. • Communicate any necessary information needed for resuming care such as date of last dilated eye exam, lab results, and any other diabetes care issues. • Resume preconception counseling/education.

Table 17: Risk Status and Corresponding Clinical Characteristics in Women with Gestational Diabetes

Risk Status	Clinical Characteristics
Low risk status: No glucose testing is required	*Low risk* women have these clinical characteristics: • Age < 25 years • Normal weight prior to pregnancy • Not a member of a population with high prevalence of GDM (e.g., American Indians, African Americans, and Hispanic/Latino) • No known diabetes in first degree relatives • No history of abnormal glucose tolerance • No history of prior obstetric complications
A*verage risk status*: Complete screening test at 24 to 28 weeks gestation is required • 50 gram oral glucose load followed by 1-hr post-plasma blood glucose • If the glucose level ≥ 140mg/dL, it is recommended to follow up with a 100 gram glucose tolerance test	*Average risk* women have these clinical characteristics: • Age ≥ 25 years • Abnormal weight prior to pregnancy • Member of a population with a high prevalence of GDM (e.g., American Indians, African Americans, and Latinos) • Known diabetes in first degree relative • History of abnormal glucose tolerance • History of prior obstetric complications
High risk status: Complete an initial screening test as soon as possible • 50 gram oral glucose load followed by 1-hr post-plasma blood glucose (regardless of time of last meal) • A 1-hr plasma blood glucose < 140 mg/dL indicates that GDM is not present at that time, but re-testing is recommended at 24-28 weeks • A 1-hr plasma blood glucose of ≥ 140mg/dL indicates follow up with a 100 gram oral glucose tolerance test (OGTT)	*High risk* women have these clinical characteristics *in addition* to those risks listed for average risk women: • Marked obesity • Personal history of GDM • Prior macrososmic infant • Glucosuria • Strong family history of diabetes

Adopted from ADA Clinical Practice Recommendations, 2004

If a woman's initial screen is positive, a 3-hour 100 gram oral glucose tolerance test (OGTT) is indicated and will provide a definite diagnosis. Table 18 provides a guide for diagnosis of GDM. Diagnosis is made from two abnormal glucose values. Providers usually use one of the two methods for diagnosis, both of which are included in Table 18.

Table 18: Result Methods for the 3-hour 100 gram Oral Glucose Tolerance Test

	O' Sullivan	Fourth International Workshop
Fasting	105 mg/dl	95 mg/dl
1-hr	190 mg/dl	180 mg/dl
2-hr	165 mg/dl	155 mg/dl
3-hr	145 mg/dl	140 mg/dl

Source: Carpenter and Coustan

Once a diagnosis of GDM is made, it is important to provide support and education. Referral to a registered dietitian, a certified diabetes educator, or other specialist is recommended. Medical nutrition therapy can provide healthy eating recommendations and ensure that all required nutrients for pregnancy are being met. A diabetes educator can initiate self-blood glucose monitoring, order supplies, and provide initial monitoring guidelines. Intensive monitoring is recommended. Optimal testing times and results are as follows:

Fasting	< 95 mg/dL
2-hour post-prandial	< 120 mg/dL

It is important for women to document blood glucose in a logbook. This data is reviewed by a health care provider and is frequently used to determine if medical intervention is needed. Most women will be able to control blood glucose with medical nutrition therapy and physical activity.

Insulin is generally used to control elevated glucose levels during pregnancy. All available types of insulin are not routinely used during pregnancy due to lack of research or history of use; thus clinical programs vary. Some programs are now using glyburide for GDM based on the research by Langer, et al. Providers not familiar with the use of these therapies and other management required should refer women to clinical programs that specialize in this care. After delivery, insulin or other therapy is usually discontinued. Any woman on insulin or other therapy for GDM is monitored through growth ultrasounds, non-stress testing, and other tests as required for women with preexisting diabetes.

Postpartum

Women with GDM are at increased risk for Type 2 diabetes and its associated metabolic abnormalities, including hypertension, dyslipidemia, and atherosclerotic cardiovascular disease. The majority of women with gestational diabetes revert to normal glycemia postpartum. An oral glucose tolerance test (OGTT) is recommended at the six-week postpartum check, or when breastfeeding has stopped. The risk for reccurring GDM is high with future pregnancies and early screening and pre-gestational counseling/education should be provided. It is essential to provide women with prevention information and tools to assist them with lifestyle changes (see Section 13: Screening for Pre-diabetes and Diabetes). Discuss and offer postpartum contraception to avoid the possibility of pregnancy immediately following recovery from delivery.

Essential Patient Education for Gestational Diabetes

All women with GDM should be fully informed of the risks associated with pregnancy. Educational strategies should take into consideration special educational and cultural needs and literacy level/skill, while respecting the individual's willingness to change behavior. Education should include, but is not limited to, the following:

- Discuss the pathophysiology of GDM.
- Explain the importance of optimal glycemic control.
- Stress intensive self-monitoring of blood glucose, incorporating diet, physical activity, and medications to attain and maintain glycemic control.
- Review any other topics essential for diabetes care (e.g., insulin, hypoglycemia, etc.)

- Teach daily urine ketone testing.
- Explain how to contact health care providers.
- Review the benefits of breastfeeding, including the possible decrease in risk of metabolic disturbances.
- Discuss the risk of GDM with future pregnancies and risk for developing Type 2 diabetes later in life.
- Discuss the importance of follow-up 2-hour 75 gram OGTT at six weeks and annual screening for pre-diabetes and Type 2 diabetes.
- Discuss the benefits of modest lifestyle changes (e.g., healthy eating, physical activity, and weight control) in delaying or preventing Type 2 diabetes.

Additional Resources

1) Becoming a Parent: Preconception Checklist, developed by the Wisconsin Association for Perinatal Care, Madison, WI. Web site located at: http://www.perinatalweb.org/association/pub_preMatBAPCheck.html.
2) Health Care Provider Reference to Becoming a Parent: Preconception Checklist, developed by the Wisconsin Association for Perinatal Care, Madison, WI. Web site located at: http://www.perinatalweb.org/association/pub_preMatHlthCarProvGuid.html.
3) Small Steps, Big Rewards. Prevent Type 2 Diabetes. National Diabetes Education Program (NDEP) Campaign. Information and materials available. Web site located at: http://www.ndep.nih.gov/campaigns/SmallSteps/SmallSteps_index.htm.

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